

September 26, 2007

Ms. Jennifer Sutter  
Department of Environmental Quality  
2020 SW Fourth Avenue, Suite 400  
Portland, OR 97201-4987

**Subject: Swan Island Upland Facility, Operable Unit 2  
Supplemental Groundwater Sampling Results  
ECSI No. 271**

Dear Jennifer:

On May 10, 2007, the Oregon Department of Environmental Quality (DEQ) requested, via electronic mail, that the Port of Portland (Port) collect groundwater samples up- and cross-gradient from MW-11 to evaluate whether there is a source of vinyl chloride (VC) in the vicinity of MW-11 on Operable Unit 2 (OU2) of the Swan Island Upland Facility (SIUF). On May 21, 2007, Bridgewater Group, Inc., on behalf of the Port, submitted a work plan describing proposed groundwater sampling methods and locations. DEQ approved the work plan on May 29, 2007 following the submittal of a revised groundwater sampling location figure (by email) on May 25, 2007.

In the May 10, 2007 email, the DEQ also requested further information to support a determination that the arsenic concentrations detected in groundwater on OU2 reflect natural conditions. This letter summarizes the supplemental groundwater sampling activities that were performed at OU2, the groundwater quality results, and provides the requested additional information regarding arsenic.

### **Supplemental Groundwater Sampling Activities**

On May 30, 2007, Ash Creek Associates, Inc. (ACA) collected groundwater samples at the five locations (OU2-GW-1 through OU2-GW-5) up- and cross-gradient of MW-11 approved by the DEQ. Figure 1 shows the groundwater sampling locations.

The groundwater samples were collected from temporary well points installed by Boart Longyear using a push probe sampling rig. Each borehole was advanced below the water table to a depth of 30 feet below ground surface (bgs) at all of the locations except OU2-GW-3; at OU2-GW-3, the borehole was advanced to 20 feet bgs. Groundwater was encountered between 27 and 30 feet bgs, except at OU2-GW-3 where it was encountered at 18 feet bgs. On August 2, 2007, Ash Creek advanced a push-probe to a depth of 30 feet bgs near the location where groundwater sample OU2-GW-3 was collected and confirmed the depth to groundwater at this location. Each groundwater sample was collected from a 4-foot screened interval, with the bottom of the screen set at the bottom of the borehole. A duplicate groundwater sample was collected at OU2-GW-3.

Attachment A contains the boring logs for locations OU2-GW-1 through OU2-GW-5. As requested by DEQ in their December 27, 2002 comment letter, ASTM soil classification procedures were followed by Ash Creek and soil samples representing the different soil types encountered in the five borings were submitted for grain size analysis to verify soil classifications made in the field.



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The sieve size analyses are consistent with the soil classifications that were made in the field. Attachment B contains the Northwest Testing, Inc. sieve analysis report and the particle size distribution plot for each sample. The particle size distribution plot also presents the borings and depths where each soil type was collected for sieve analysis.

## Groundwater Quality

**Investigation Results.** The five groundwater samples, one duplicate sample (from OU2-GW-3), and one trip blank were submitted to Columbia Analytical Services for analysis by EPA Method 8260B. The analytical data are tabulated in Table 1. Attachment C contains the laboratory analytical report.

- No volatile organic compounds (VOCs) were detected in the two sampling locations near the shoreline of the Willamette River and cross-gradient from MW-11 (i.e., OU2-GW-4 and OU2-GW-5).
- No VOCs were detected in two of the three sampling locations up-gradient of MW-11 (i.e., OU2-GW-1 and OU2-GW-2).
- Two breakdown products of chlorinated compounds were detected (VC = 6.5 ug/L and cis-1,2-dichloroethene [cis-1,2-DCE] = 14 ug/L) in the groundwater sample collected at location OU2-GW-3. Similar concentrations were detected in the duplicate sample (VC at 7 ug/L and cis-1,2-DCE at 14 ug/L). For comparison, the VC and cis-1,2-DCE concentrations detected in the most recent sample collected from MW-11 (October 5, 2006) were 3.3 and 5.9 ug/L, respectively.

**Arsenic Background.** The Port reviewed historical groundwater data for arsenic on OU2 and concluded that the observed concentrations are low and consistent with concentrations at other riverfront sites. Subsurface soil sampling conducted throughout OU2 at depths of 5 feet below ground surface (bgs) and 16 to 18 feet bgs (near the water table) indicate that arsenic concentrations range from 1.6 to 3.02 mg/kg (see Table 11 in the March 20, 2007 OU3 No Further Action determination request letter). These concentrations are below the default background concentration of 7 mg/kg contained in DEQ's October 28, 2002 Default Background Concentrations for Metals, Memorandum to DEQ Project Managers. In addition, a report prepared by the United States Geological Survey (USGS) and United States Department of the Interior in conjunction with the Oregon Water Resources Department (Water Resources Investigation Report 98-4205, 1999) supports that the arsenic concentrations detected in the groundwater on OU2, as well as elsewhere at the SIUF, are well within the range of arsenic concentrations detected across Oregon, including the Portland area.

## Summary

The Port reviewed the historical groundwater data for arsenic and concluded that the observed concentrations reflect natural conditions (i.e., consistent with other riverfront sites and published literature (Water Resources Investigation Report 98-4205). Arsenic concentrations in subsurface soil samples collected throughout OU2 further support our conclusion that observed concentrations in groundwater reflect natural conditions.

The Port collected five additional groundwater samples up- and cross-gradient from MW-11 to evaluate whether there is a source of VC in the vicinity of MW-11 on OU2 of the SIUF. No VOCs were detected in groundwater samples collected near the Willamette River shoreline, cross-gradient from MW-11. VC and cis-1,2-DCE were detected at slightly higher concentrations than were detected in MW-11 at one of the three up-gradient sampling locations (OU2-GW-3). The detected concentration of VC slightly exceeds the human health fish consumption screening level at location OU2-GW-3 (Table 1) and in well MW-11. However, these screening levels assume the aquatic organisms are directly exposed to these constituent levels. Based on the low concentrations detected in groundwater, it is unlikely that aquatic receptors would be exposed to unacceptable concentrations in the adjacent surface water after mixing with groundwater.

As indicated in the DEQ's May 29, 2007 electronic mail, additional investigation would be required if contaminants of concern were detected in either of the two groundwater samples collected near the river. Because no VOCs were detected at locations OU2-GW-4 and OU2-GW-5, the Port assumes that the OU2 groundwater investigation is complete.

Please give me a call if you have any questions regarding the supplemental sampling results.

Sincerely,



Nicole LaFranchise  
Environmental Project Manager

Attachments:

- 1) Table 1 – Groundwater Chemistry Results: VOCs
- 2) Figure 1 – Operable Unit 2 Supplemental Groundwater Sampling Locations
- 3) Attachment A – Soil Boring Logs
- 4) Attachment B – Sieve Analysis Report
- 5) Attachment C – Laboratory Analytical Report (CD-ROM)

c: Kristine Koch, EPA  
David Ashton, Port (w/o attachments)  
Quentin Pitts (w/o attachments)  
Anne Summers, Port (w/o attachments)  
Bob Teeter, Port (w/o attachments)  
Stuart Brown, Bridgewater (w/o attachments)  
Amanda Spencer, Ash Creek Associates (w/o attachments)  
Michael Pickering, Ash Creek Associates (w/o attachments)  
Mark Lewis, NewFields (w/o attachments)  
LWP File

Table 1

## Groundwater Chemistry Results: VOCs

## Swan Island Upland Facility, OU2 – Supplemental Groundwater Sampling Results

## Portland, Oregon

Sample Number Sample Date	Screening Levels - Detected Analytes				OU2-GW-1	OU2-GW-2	OU2-GW-3	OU2-GW-3-DUP	OU2-GW-4	OU2-GW-5	Trip Blank
	HH AWQC <sup>6</sup>	DEQ RBC <sup>7</sup>	FW AWQC <sup>8</sup>	DEQ SLV <sup>9</sup>	05/30/2007	05/30/2007	05/30/2007	05/30/2007	05/30/2007	05/30/2007	05/30/2007
<b>VOCs</b>	Concentrations in µg/kg (ppb)										
1,1,1,2-Tetrachloroethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,1-Trichloroethane (TCA)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2,2-Tetrachloroethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1,2-Trichloroethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethane (1,1-DCA)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloroethene (1,1-DCE)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,1-Dichloropropene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichlorobenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,3-Trichloropropane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2,4-Trimethylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromo-3-chloropropane (DBCP)	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dibromoethane (EDB)	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,2-Dichlorobenzene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloroethane (EDC)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dichloropropane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3,5-Trimethylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
1,3-Dichlorobenzene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,3-Dichloropropane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,4-Dichlorobenzene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2,2-Dichloropropane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
2-Butanone (MEK)	*	*	*	*	20 U	20 U	20 U	20 U	20 U	20 U	20 U
2-Chlorotoluene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
2-Hexanone	*	*	*	*	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Chlorotoluene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Isopropyltoluene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
4-Methyl-2-pentanone (MIBK)	*	*	*	*	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	*	*	*	*	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromobenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Bromochloromethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromodichloromethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromoform	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Bromomethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon Disulfide	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Carbon Tetrachloride	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chlorobenzene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloroform	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Chloromethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene	--	410,000	--	590	0.50 U	0.50 U	14	14	0.50 U	0.50 U	0.50 U
cis-1,3-Dichloropropene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromochloromethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dibromomethane	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichlorodifluoromethane (CFC 12)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Dichloromethane (Methylene Chloride)	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Ethylbenzene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Hexachlorobutadiene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Isopropylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
m,p-Xylenes	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Naphthalene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
n-Butylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
n-Propylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
o-Xylene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
sec-Butylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Styrene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
tert-Butylbenzene	*	*	*	*	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Tetrachloroethene (PCE)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Toluene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,2-Dichloroethene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
trans-1,3-Dichloropropene	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichloroethene (TCE)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Trichlorofluoromethane (CFC 11)	*	*	*	*	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Vinyl Chloride	2.4	870	--	--	0.50 U	0.50 U	6.5	7.0	0.50 U	0.50 U	0.50 U

## Notes:

1. VOCs = Volatile Organic Compounds by EPA Method 8260B.

2. µg/L = micrograms per liter (parts per billion [ppb]).

3. U = Not detected above the method reporting limit.

4. Shading = Detected concentration.

5. \* = Analyte not detected - screening level not presented.

6. HH AWQC = EPA National Recommended Water Quality Criteria, Protection of Human Health from Organism Consumption Only. EPA, 2004.

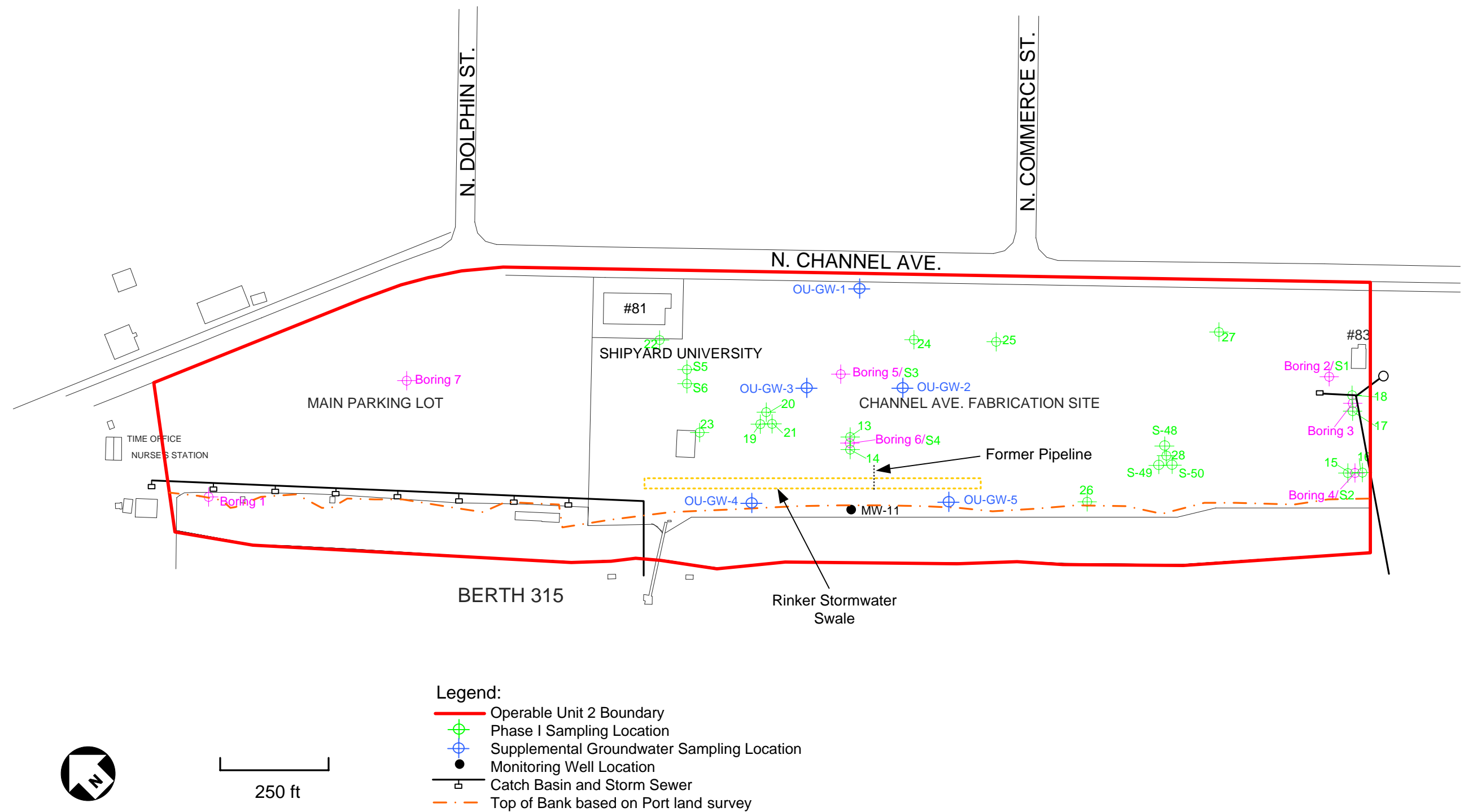
7. DEQ RBC = Oregon Department of Environmental Quality Risk-Based Concentrations (DEQ, 2003, RBC Table revised July 4, 2007) - Vapor Intrusion (Occupational).

8. FW AWQC = EPA National Recommended Water Quality Criteria, Protection of Freshwater Aquatic Organisms, Criteria Continuous Concentration (CCC). EPA, 2004.

9. DEQ SLV = Oregon Department of Environmental Quality Level II Screening Level Values. December 2001.


10. -- Screening level not available.


11. Bold = Exceeds screening level.




**Figure 1**  
**Operable Unit 2 Supplemental Groundwater Sampling Locations**  
**Swan Island Upland Facility**


**Attachment A**  
**Soil Boring Logs for**  
**Swan Island Upland Facility**  
**Operable Unit 2**  
**Supplemental Groundwater Sampling Locations**

 <b>Ash Creek Associates, Inc.</b> Environmental and Geotechnical Consultants		<b>Port of Portland - SUIF</b> <b>Portland, Oregon</b>		Log Of Exploration Number: <b>OU2-GW-1</b>		
				Project Number: <b>1115-05</b>		
Boring Location: <b>See Figure 2</b>				Surface Elevation: <b>Not Measured</b>		
Drilling Contractor: <b>Boart Longyear</b>				Date Started: <b>May 30, 2007</b>		
Drilling Method: <b>Direct Push, 5-Ft. Sampler</b>				Date Finished: <b>May 30, 2007</b>		
Drilling Equipment: <b>Geoprobe 6620DT</b>				Logged By: <b>K. Boris</b>		
				Depth to Water (ATD): <b>27.9'</b>		
Depth, feet	Sample ID	Sample	Recovery Length	Sheen	PID	Material Description
5					<5	Gravel surface over silty SAND; brown, moist, medium-grained, (medium dense). Fine-grained after 11".
					<5	SILT; brown to gray, moist, (medium stiff).
						SAND; brown, very moist, medium-grained, with iron staining, (medium dense).
5					<5	Becomes dark gray.
					<5	SILT; dark gray, moist, (medium stiff).
					<5	SAND; reddish brown, moist, medium-grained, with trace gravel, (medium dense).
10					<5	
					<5	
15					<5	SILT; dark gray, moist, (medium silt).
					<5	
20					<5	
					<5	
25					<5	Silty SAND; brown, wet, fine-grained, (medium dense). 4-Inch silt lens. Becomes moist.
					<5	SILT; brown, very moist, (medium stiff).
					<5	Silty SAND; brown, wet, fine- to medium-grained, (medium dense).
					<5	SILT; brown, very moist, (medium stiff).
					<5	SAND; brown, wet, medium-grained, (medium dense).
					<5	SILT; brown, wet, (medium stiff).
					<5	SAND; brown, wet, medium-grained, (medium dense).
30						Bottom of Boring at 30.0' BGS.
35						



OU2-GW-1

 Ash Creek Associates, Inc. Environmental and Geotechnical Consultants			Port of Portland - SUIF Portland, Oregon			Log Of Exploration Number: <b>OU2-GW-2</b>		
						Project Number: <b>1115-05</b>		
Boring Location: <b>See Figure 2</b>						Surface Elevation: <b>Not Measured</b>		
Drilling Contractor: <b>Boart Longyear</b>						Date Started: <b>May 30, 2007</b>		
Drilling Method: <b>Direct Push, 5-Ft. Sampler</b>						Date Finished: <b>May 30, 2007</b>		
Drilling Equipment: <b>Geoprobe 6620DT</b>						Logged By: <b>K. Boris</b>		
						Depth to Water (ATD): <b>29.5'</b>		
Depth, feet	Sample ID	Sample	Recovery Length	Sheen	PID	Material Description		
				ND	7	Gravel surface over SAND, SILT, and GRAVEL Fill; brown-gray, moist, (dense).		
					<5			
5				ND	32			
					<5	SAND; reddish-brown, moist, medium-grained, with trace silt, (medium dense).		
10					<5	Very sandy SILT; gray, moist to wet, (medium stiff).		
					<5	SAND; gray, very moist, medium grained, (medium dense).		
					<5	SILT; gray, moist, with fine-grained sand, (medium stiff).		
15					<5	No sand below 15'. SAND; dark gray, very moist, (medium dense).		
					<5			
					<5	SILT; dark gray, moist, (medium stiff).		
20					<5			
					<5			
					<5	Fine sandy SILT; dark gray, wet, (medium stiff).		
25					<5	No sand below 26.5'. 10-Inch iron-stained lens.		
					<5	Silty SAND; reddish-brown, wet, (medium dense). 2-Inch silt lens.		
30					<5	No silt below 28.5'. SILT, reddish-brown, wet, (medium stiff). Silty SAND; reddish-brown, wet, (medium dense).		
						Bottom of Boring at 30.0' BGS.		
35								





OU2-GW-2

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OU2-GW-2

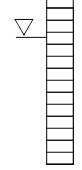


 Ash Creek Associates, Inc. Environmental and Geotechnical Consultants		Port of Portland - SUIF Portland, Oregon		Log Of Exploration Number: <b>OU2-GW-3</b>		
				Project Number: <b>1115-05</b>		
Boring Location: <b>See Figure 2</b>				Surface Elevation: <b>Not Measured</b>		
Drilling Contractor: <b>Boart Longyear</b>				Date Started: <b>May 30, 2007</b>		
Drilling Method: <b>Direct Push, 5-Ft. Sampler</b>				Date Finished: <b>May 30, 2007</b>		
Drilling Equipment: <b>Geoprobe 6620DT</b>				Logged By: <b>K. Boris</b>		
				Depth to Water (ATD): <b>17.5'</b>		
Depth, feet	Sample ID	Sample	Recovery Length	Sheen	PID	Material Description
5					<5	Gravel surface over SAND, SILT, and GRAVEL Fill; brown-gray, moist, (dense).
					<5	
10					<5	Sandy SILT; brown-gray, moist, with gravels, with iron staining, (stiff). SAND; brown, moist, medium-grained, (medium dense).
					<5	Very moist below 11.5'.
15					<5	Very sandy SILT; brown to gray, moist, (medium stiff). SAND; dark gray, moist, medium-grained, (medium dense). Sandy SILT; gray, very moist, (medium stiff).
					<5	Becomes wet with no sand below 15'.
20					<5	SAND; dark gray, wet, medium-grained, (medium dense).
					<5	Bottom of Boring at 20.0' BGS.
25						
30						
35						




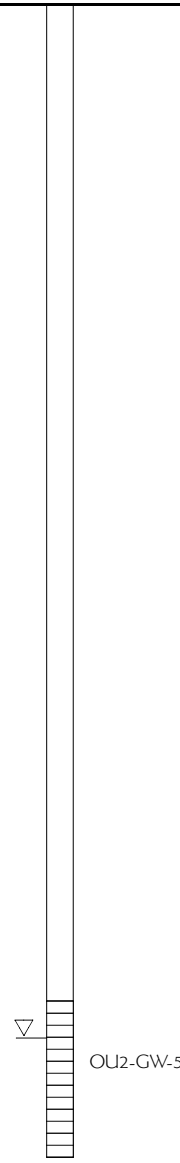
OU2-GW-3

 <b>Ash Creek Associates, Inc.</b> Environmental and Geotechnical Consultants		<b>Port of Portland - SUIF</b> <b>Portland, Oregon</b>		Log Of Exploration Number: <b>OU2-GW-4</b>		
				Project Number: <b>1115-05</b>		
Boring Location: <b>See Figure 2</b>				Surface Elevation: <b>Not Measured</b>		
Drilling Contractor: <b>Boart Longyear</b>				Date Started: <b>May 30, 2007</b>		
Drilling Method: <b>Direct Push, 5-Ft. Sampler</b>				Date Finished: <b>May 30, 2007</b>		
Drilling Equipment: <b>Geoprobe 6620DT</b>				Logged By: <b>K. Boris</b>		
				Depth to Water (ATD): <b>26.7'</b>		
Depth, feet	Sample ID	Sample	Recovery Length	Sheen	PID	Material Description
5					<5	Gravel surface over SAND, SILT, and GRAVEL Fill; brown, dry to moist, (dense).
					<5	SILT; brown, moist, with iron staining, (medium stiff).
					<5	SAND; reddish-brown, moist, medium-grained, (medium dense).
5					<5	Trace gravel.
					<5	
10					<5	
					<5	Becomes very moist below 13.5'.
15					<5	
					<5	Fine sandy SILT; dark gray, very moist, (medium stiff).
20					<5	No sand below 20'.
					<5	
25					<5	Becomes brown with iron staining below 24.5'.
					<5	10-Inch fine sand lens.
30					<5	With fine sand below 29'.
						SAND; brown, wet, medium-grained, (medium dense).
						Bottom of Boring at 30.0' BGS.
35						



OU2-GW-4

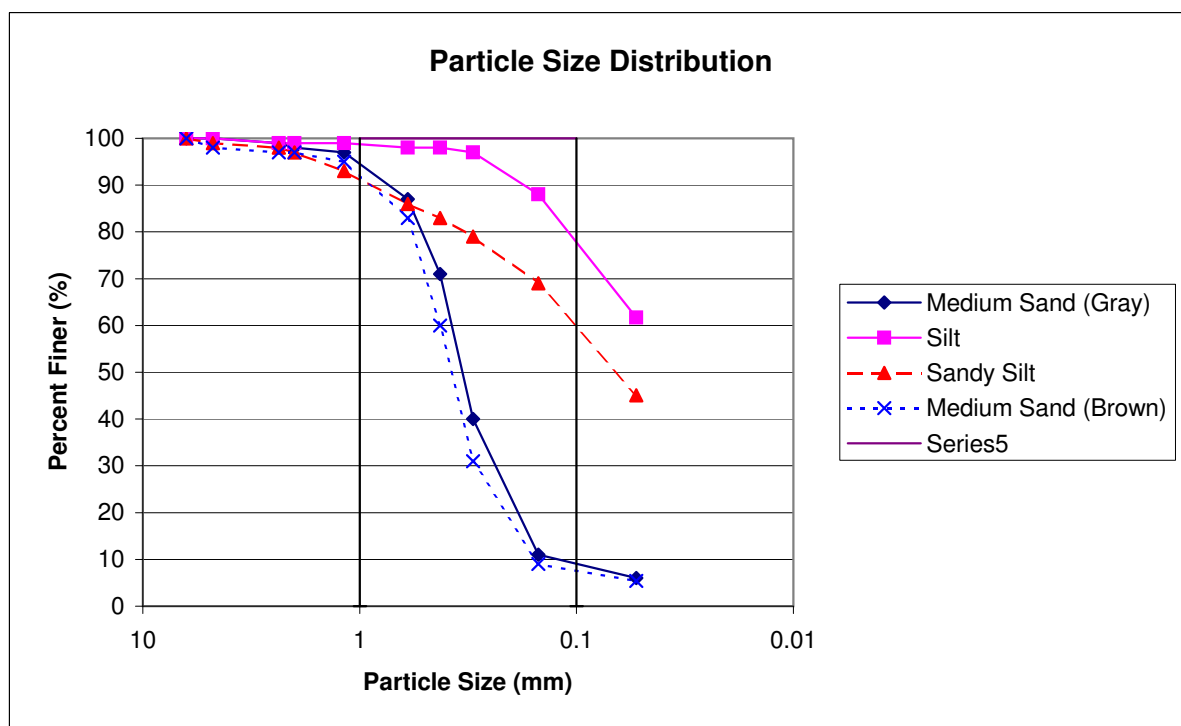
 <b>Ash Creek Associates, Inc.</b> Environmental and Geotechnical Consultants		<b>Port of Portland - SUIF</b> <b>Portland, Oregon</b>		Log Of Exploration Number: <b>OU2-GW-5</b>		
				Project Number: <b>1115-05</b>		
Boring Location: <b>See Figure 2</b>				Surface Elevation: <b>Not Measured</b>		
Drilling Contractor: <b>Boart Longyear</b>				Date Started: <b>May 30, 2007</b>		
Drilling Method: <b>Direct Push, 5-Ft. Sampler</b>				Date Finished: <b>May 30, 2007</b>		
Drilling Equipment: <b>Geoprobe 6620DT</b>				Logged By: <b>K. Boris</b>		
				Depth to Water (ATD): <b>26.9'</b>		
Depth, feet	Sample ID	Sample	Recovery Length	Sheen	PID	Material Description
					<5	Gravel and topsoil surface over SAND, SILT, and GRAVEL Fill; brown, moist, (medium dense).
					<5	SAND; reddish-brown, moist, medium-grained, with occasional gravel, (medium dense).
5						No gravel below 5'.
					<5	
					<5	
10					<5	
					<5	
					<5	
15					<5	
					<5	
					<5	
20					<5	
					<5	
					<5	
25						Becomes very moist. Becomes wet.
					<5	
					<5	
30						With occasional gravel below 28.5'.
						Bottom of Boring at 30.0' BGS.
35						



**Attachment B**  
**Sieve Analysis Report for**  
**Swan Island Upland Facility**  
**Operable Unit 2**  
**Soil Boring Samples**

**Table B-1**  
**Sieve Analysis Plot**  
**Swan Island Upland Facility, OU2 – Supplemental Groundwater Sampling Results**  
**Portland, Oregon**

Field Classification:		Medium Sand	Silt	Sandy Silt	Medium Sand
Boring ID / Depth (feet bgs):		GW-2 / 15 - 19	GW-1 / 17 - 20	GW-2 / 10 - 12	GW-1 / 2.5 - 5
		GW-3 / 17.5 - 20	GW-2 / 20 - 24	GW-3 / 13.5 - 17	GW-3 / 8 - 12
Sieve Size	Particle Size (mm)	Sample 1	Sample 2	Sample 3	Sample 4
	(mm)	Percent Passing			
1/4"	6.3	100	100	100	100
4	4.75	100	100	99	98
8	2.36	99	99	98	97
10	2	98	99	97	97
16	1.18	97	99	93	95
30	0.6	87	98	86	83
40	0.425	71	98	83	60
50	0.3	40	97	79	31
100	0.15	11	88	69	9
200	0.053	6	61.7	45.1	5.4





# Northwest Testing, Inc.

A Division of Northwest Geotech, Inc.

9120 SW Pioneer Court, Suite B • Wilsonville, Oregon 97070

## FACSIMILE TRANSMITTAL

TO: Ms. Kirsten Boris, E.I.T., Ash Creek Associates  
503-924-4707

FROM: Bridgett Adame

**NORTHWEST TESTING, INC.**  
(503) 682-1880 PHONE (503) 682-2753 FAX

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SPECIAL INSTRUCTIONS

Project No. 1579.1.1

Technical Report

Lab No. 07-195

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## TECHNICAL REPORT

**Report To:** Ms. Kirsten Boris, E.I.T.  
 Ash Creek Associates, Inc.  
 9615 SW Allen Boulevard, Suite 106  
 Portland, Oregon 97005-4814

**Date:** 6/14/07

**Lab No:** 07-195

**Project:** Laboratory Testing

**Project No.:** 1579.1.1

**Report of:** Sieve analysis

### Sample Identification

NTI determined the sieve analysis on four samples delivered to our laboratory on June 5, 2007 by an Ash Creek Associates representative. Testing was performed in accordance with the standards indicated. Our laboratory test results are summarized on the following table.

### Laboratory Test Results

Sieve Analysis of Aggregate (ASTM C117/C136)				
Sieve Size	Sample 1 Percent Passing	Sample 2 Percent Passing	Sample 3 Percent Passing	Sample 4 Percent Passing
¾"	100	100	100	100
#4	100	100	99	98
#8	99	99	98	97
#10	98	99	97	97
#16	97	99	93	95
#30	87	98	86	83
#40	71	98	83	60
#50	40	97	79	31
#100	11	88	69	9
#200	6.0	61.7	45.1	5.4

**Copies:** Addressee

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SHEET 1 of 1

REVIEWED BY: Bridgett Adame

TECHNICAL REPORT

labtests\07-195 SA.doc

**Attachment C**  
**Laboratory Analytical Report for**  
**Swan Island Upland Facility**  
**Operable Unit 2**  
**Supplemental Groundwater Samples**  
**(CD-ROM)**